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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte FRANCIS M. CREIGHTON IV, ROGERS C. RITTER,
ANDREW F. HALL, and ROGER N. HASTINGS

Appeal 2008-4386
Application 10/674,667
Technology Center 3700

Decided: August 15, 2008

Before ERIC GRIMES, LORA M. GREEN, and RICHARD M. LEOVITZ
Administrative Patent Judges.

GREEN, *Administrative Patent Judge.*

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 39-41, 45-47, 51, and 52. We have jurisdiction under 35 U.S.C. § 6(b). Claims 39, 41, and 45 are representative of the claims on appeal, and read as follows:

39. A compound magnet having a front face and comprising a plurality of segments, the segments each magnetized to provide the maximum magnetic field in a selected direction at the same selected operating point spaced from the front face of the magnet.

41. A magnet having a front and a back face and comprising a plurality of segments, the segments each magnetized to provide substantially the maximum magnetic field in a selected direction at the same operating point spaced from the front face, the back being substantially contoured to follow a surface of constant contribution to magnetic field in the selected direction at the operating point.

45. A magnet for applying magnetic field in a selected direction at a selected operating point, the magnet comprising a front face generally facing the operating point, and an at least approximately curved back face facing away from the operating point, the back face generally conforming to a constant contribution surface of the magnetic field in the selected direction.

The Examiner relies on the following references:

Leupold	5,216,400	Jun. 1, 1993
Holcomb '321	5,312,321	May 17, 1994
Holcomb '531	6,042,531	Mar. 28, 2000

We reverse.

BACKGROUND

The invention is drawn to “systems for magnetically-assisted surgery and more particularly to systems for producing the magnetic fields required to guide surgically implanted magnetic medical devices.” (Spec. 1.)

Figure 9 of the Specification, depicting a magnet according to the invention, is reproduced below:

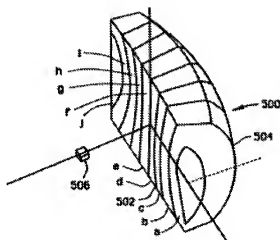


FIG. 9

Figure 9 is “a perspective view of a compound magnet constructed according to the . . . invention.” (Spec. 10.) The magnet, 500, “has a front face 502 and a back face 504.” (*Id.* at 24.) In addition, the magnet is “specially constructed to provide a magnetic field F in a selected direction at a selected operating point 506 spaced from the front face 502 of the magnet.” (*Id.*) The operating point, 506, “is at least about six inches (15.2 cm), and is preferably about 8 inches (20.3 cm) from the front face.” (*Id.*) The Specification teaches further that the front face 502 of the magnet is preferably substantially flat, whereas the back face 504 is generally curved, conforming substantially to “a surface of constant contribution.” (*Id.* at 24-25.) “A surface of constant contribution is the surface along which optimally aligned magnetic moments contribute equally to the magnetic field F.” (*Id.* at 25.)

According to the Specification:

The magnet 500 is preferably divided into a plurality of segments of constant magnetization direction. Ideally, the magnet 500 would have a local magnetization direction at each point that maximizes this magnetic field F at the operating point

506. However such an ideal configuration would be difficult to practically obtain. Instead, the magnet is preferably divided into a number of segments of uniform magnetization. In accordance with one embodiment of the compound magnet of this invention, the magnet 500 is divided into segments, and the proper magnetization direction is determined for each segment. In accordance with an alternate embodiment of the magnet 500, the magnet is divided into segments of identical or similar magnetization direction.

(*Id.* at 25-26.)

The Specification teaches further:

The magnet 500, made from a ten by eleven array of segments 500 a,a 500j,k made [sic, made of?] NdBFe 5062, with a front face 502 of 18 inches (45.7 cm) by 18 inches (45.7 cm), and an operating point 9 inches (22.9 cm) from the front face would have a total weight of 511 pounds. The magnet 500 would be capable of generating a magnetic field F of 0.1 T, at the operating point 506, 9 inches from the face 502. In contrast, a conventional cylindrical bi-polar magnet of the same material would have to have dimensions of 24 inches in diameter, and 16 inches high, and have a weight of 2100 pounds in order to generate a comparable magnetic field at a comparable distance. Thus the magnet 500 can generate a magnetic field that is usable for magnetic navigation inside the body with a much small volume and weight than conventional magnets, and this smaller, lighter magnet is easier to manipulate (translate and rotate) as needed during the magnetic navigation procedure.

(*Id.* at 28.)

The magnetic field produced by the magnet of Figure 9 is shown in Figure 20 of the instant disclosure, which is reproduced below:

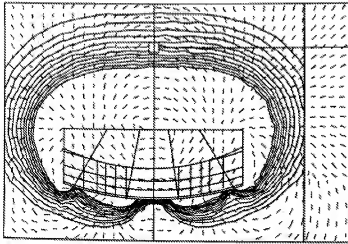


FIG. 20

Figure 20 is a horizontal cross-sectional view of the disclosed magnet demonstrating the magnetic field lines (Spec. 11). The Figures “shows a detailed and accurate plot of the magnetic field lines as a quiver diagram, and contours of constant field strength” (*Id.* at 35).

DISCUSSION

Claims 39-41, 45-47, 51, and 52 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite.

As to claims 39 and 41, the Examiner asserts that there is insufficient antecedent basis for the limitation “the same selected operating point” found in the last two lines of the claim (Ans. 3).

“The test for definiteness is whether one skilled in the art would understand the bounds of the claim when read in light of the specification.” *Miles Laboratories, Inc. v. Shandon, Inc.*, 997 F.2d 870, 875 (Fed. Cir. 1993). Claims are in compliance with 35 U.S.C. § 112, second paragraph, if “the claims, read in light of the specification, reasonably apprise those

skilled in the art both of the utilization and scope of the invention, and if the language is as precise as the subject matter permits.” *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1385 (Fed. Cir. 1987).

As noted by Appellants, “‘the same selected operating point’ merely describes the position of the magnetic field generated by the claimed magnet, and therefore does not require separate antecedent basis.” (Reply Br.¹ 2.) We thus reverse the rejection.

As to claims 45-47, 51, and 52, the Examiner asserts that “the phrase ‘an at least approximately curve’ renders the claim indefinite because it is unclear whether the limitation(s) following the phrase are part of the claimed invention.” (Ans. 3-4.) It is clear to us the limitations following the phrase are part of the claimed rejection, and we thus reverse this rejection as well.

Claims 39-41, 45-47, 51, and 52 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Leupold.²

The Examiner relies on Figure 5 of Leupold, reproduced below:

¹ The pages of the Reply Brief were not numbered, thus we designated the page entitled “REPLY BRIEF” as the first page, and numbered the remaining pages accordingly.

² Note that this was designated a new ground of rejection (Ans. 3).

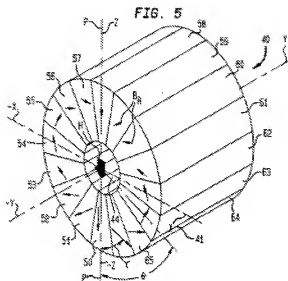


Figure 5 of Leupold shows a segmented, cylindrical “magic-ring” type of magnet (Leupold, col. 5, ll. 52-53). According to the Examiner, “Leupold discloses a permanent magnet having a plurality of segments . . . which are uniformly magnetized to provide substantially the maximum magnetic field in a selected direction at an operating point spaced from the front face (col. 2 line 66 - col. 3 line 11), the back face being substantially contoured to follow a surface of constant contribution to magnetic field in the selected direction at the operating point (col. 5 line 59-col. 6 line 17, see fig. 5).” (Ans. 8.)

In order to establish anticipation, every element and limitation of the claimed invention must be found in a single prior art reference, arranged as in the claim. *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383 (Fed. Cir. 2001).

Appellants argue that Leupold “discloses magnet segments having varying magnetization directions for generating a field H within the magnet’s internal volume or cavity (17), rather than a field that is spaced from the magnet.” (Reply Br. 5). Appellants assert, unlike the magnetic field within the interior of the cylindrical magnet of Leupold, which is too

constraining to be useful as an operating point, “Appellant’s magnet segments are configured to generate a magnetic field at an operating point spaced from the external front face of the magnet.” (*Id.*)

We agree. Leupold teaches that the magnet 40 of Figure 5 (shown above), “has a plurality of similar segments 50-65 that are nested to form a cylindrical shell 41 with a concentric cylindrical cavity 44.” (Leupold col. 5, ll. 52-55). Access to the cavity is through an access port that passes through one or more of the segments or by the open end of the shell 41 (*id.* at ll. 56-58). The magnet 40 produces an axially tapered field in the cavity (*id.* at col. 3, ll. 20-24).

We recognize that during prosecution before the Office, claims are to be given their broadest reasonable interpretation consistent with the Specification as it would be interpreted by one of ordinary skill in the art. *In re American Academy of Science Tech Center*, 367 F.3d 1359, 1364 (Fed. Cir. 2004). All of the independent claims on appeal require a magnet having a front face and comprising a plurality of magnets, wherein the segments are each magnetized to provide the [substantially] maximum magnetic field in a selected direction at the same selected operating point generally facing or spaced from the front face. The Examiner does not explain how the face of the interior cavity of the magnet shown in Figure 5 of Leupold reads on a front face. Moreover, based on the Specification and the Figures, such as Figure 9 of the instant disclosure, we conclude that one of ordinary skill in the art would not interpret a “front face” wherein “the segments are each magnetized to provide the [substantially] maximum magnetic field in a selected direction at the same selected operating point spaced from the front face” as encompassing the cylindrical magnet of Leupold, wherein the

magnet produces an axially tapered field in the cavity. Thus, the Examiner has not met the burden of setting forth a prima facie case of anticipation, and the rejection is reversed.

Claims 39, 41, and 45-47 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Holcomb '531.

The Examiner relies on Figure 9 of Holcomb '531, reproduced below.

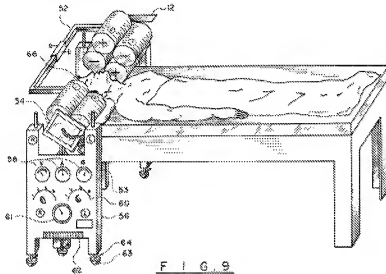


Figure 9 is a perspective view of the electromagnetic treatment device of Holcomb '531 (Holcomb '531 col. 14, ll. 20-21). According to the Examiner, "Holcomb discloses a magnet having a front and back face and comprising a plurality of segments . . . , the segments each magnetized to provide substantially the maximum magnetic field in a selected direction at an operating point spaced from the front face, the back face substantially contoured to follow[] a surface of constant contribution to magnetic field in

the selected direction at the operating point (abstract, column 15, lines 5-67, Figs. 2 and 3).” (Ans. 4-5.)

Appellants argue that Holcomb ‘531 does not teach or suggest “a compound magnet comprising a plurality of segments, where each segment is magnetized to provide a magnetic field in a selected direction at the same operating point spaced from the front face of the magnet.” (App. Br. 6.) Appellants assert that the magnets of Holcomb ‘531 are cylindrical magnet bodies, rather than a compound magnet constructed of segments (*id.* at 7).

According to Appellants:

The present application describes one exemplary compound magnet made from an array of segments at a total weight of 511 pounds that was capable of generating a magnetic field of 0.1 Tesla at an operating point 9 inches from the front face. The present application also contrasts this exemplary compound magnet with a conventional cylindrical bi-polar magnet, which would need to weigh 2100 pounds to produce a comparable magnetic field at a comparable distance. Thus, a person of ordinary skill in the art would understand from the specification the distinction between Appellants’ compound magnet and a conventional cylindrical bi-polar magnet.

(*Id.* at 6)

Appellants argue further that the four Holcomb ‘531 magnets have opposing polarity, each magnet providing “fields in different directions to create a complex quadrilateral-shaped field.” (App. Br. 7.) Appellants submit “that one skilled in the art would clearly understand a magnetic field having a selected direction to mean a magnetic field having a series of constant field strength directions.” (App. Br. 8.) Appellants further cite to Figure 7 of Holcomb ‘531 which shows the non-uniform field generated by the quadrupole formed by the four magnets of Holcomb ‘531 (Reply Br. 3).

We agree. Figure 7 of Holcomb '531 is reproduced below:

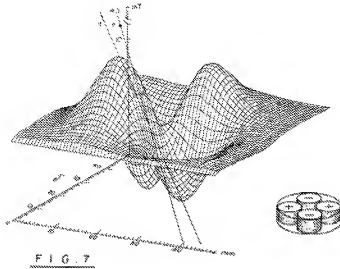


Figure 7 is a diagram of the positive field that is identical to the electromagnetic field produced by the magnet of Holcomb '531 (Holcomb '531 col. 14, ll. 6-15).

As noted above, all of the independent claims on appeal require a magnet having a front face and comprising a plurality of segments, wherein the segments are each magnetized to provide the [substantially] maximum magnetic field in a selected direction at the same selected operating point spaced from the front face. The magnetic field as shown in Figure 7 of Holcomb '531 produced by the four cylindrical magnets is not such a field. Thus, the Examiner has not set forth a prima facie case that Holcomb '531 anticipates claims 39, 41, and 45-47, and we thus reverse the rejection.

Claims 40, 51, and 52 stand rejected under 35 U.S.C. § 103(a) as being obvious over the combination of Holcomb '531 as combined with Holcomb '321.

According to the Examiner, “Holcomb ’531 teaches all the limitations of the claimed subject matter except for mentioning specifically that each segment of the magnet is magnetized in the direction of magnetization that, at the center of mass of the segment, provides the maximum contribution to the magnetic field in the selected direction at the selected operating point.” (Ans. 6.)

Holcomb ’321 is cited for teaching “a magnet in which each segment is magnetized in the direction of magnetization that, at the center of mass of the segment, provides the maximum contribution to the magnetic field in the selected direction at the selected operating point. (see figures 2, 3 and 5, column 3, lines 42-68 and column 4, lines 1-26).” (Ans. 6-7.)

Figure 17B of Holcomb ’321 is reproduced below.

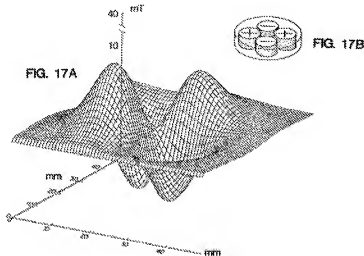


Figure 17B is an illustration of the magnetic field of the magnet of Figure 2 of Holcomb ’321 (Holcomb ’321 col. 2, ll. 54-56), relied upon by the Examiner in rejecting the claims. As can be seen from the reproduced

Figure, Holcomb '321 suffers from the same deficiency as Holcomb '531.
Thus, we reverse this rejection as well.

CONCLUSION

In summary, as the Examiner has not set forth a prima facie case of unpatentability as to any of the claims on appeal, the rejections on appeal are reversed.

REVERSED

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